BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

REMARKS/ARGUMENTS

Upon entry of the amendment, the claims will remain as Claims 1-7.

Examiner Lien Tran is thanked for the interview granted Applicants' representative on May 5, 2004. The following includes the substance of the presentation made at that interview.

The amendment here presented to Claims 1, 6 and 7 is submitted to reinforce the recitation that the fresh bread crumbs are mixed with "powdery starch and/or powdery protein" and the crumbs prior to drying are "free of added liquid". The recitation is inherent in the claims themselves since added liquid would destroy the powdery character of the recited additives. And it is evident from a discussion of the prior art, particularly Japanese *Kokai No.* 8-228705 on pages 2 and 3 of the subject application that added liquid is undesirable.

While at page 7, in the sentence at line 5, it is disclosed that "if desired...liquid or solid oil...may be caused to adhere to fresh bread crumbs", it is clear from the sentence as a whole that liquid oil may be excluded.

Reconsideration and withdrawal of the rejection of Claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Rispoli et al. in view of Bernacchi et al. are requested.

The rationale of the rejection is stated as follows:

> Rispoli et al. disclose a process of making a bread crumb composition. The process comprises the steps of adhering an adhesive comprising a protein in amount of 1-20% and up to 10% starch. The composition may also contain seasonings such as salt, sugar, garlic etc... in any amount of up to 15%. (see columns 3-4)
>
> The amounts of protein, starch and sugar fall within the ranges claimed. Rispoli does not teach applying the adhesive to fresh bread crumbs and then drying.
>
> Bernacchi et al teach to apply protein to bread crumbs. They teach the protein can be applied by coating the protein dispersion to wet crumb and then drying (see col. 7 lines 23-26).

Applicants add, in response, that the only methods of applying actually disclosed by Rispoli et al. involve the use of an edible oil and application is by spraying, please see col. 3, the paragraphs at lines 33 and 50 and the procedure in Example I. This is not application and adhesion of powdery additives as such.

In fact, at col. 3, the sentence at line 24, Rispoli et al. teach away from dry mixing.

The Official Action then refers to Bernacchi et al. for disclosure of application to "fresh bread crumbs", noting application to "wet crumb" disclosed at col. 7, lines 24-26. The position taken is that "wet crumb" is inclusive of "fresh crumb".

The Official Action further states (near bottom of page 3) that:

> In any event, it would have been obvious to apply the adhesive to dry bread crumb or non-dry bread crumbs as both alternatives are known in the art as shown by the Bernacchi et al reference

and finally, the Official Action states (page 4)

> Therefore, it would have been obvious to use dry adhesive when moist crumb is used if one wants to quicken the drying time. All these variations are within the determination of one skilled in the art; the end result is then same.

In response, Applicants state that "fresh bread" and "fresh bread crumbs" are recognized terms in the art, and that the assertion that all variations are "within the determination of one skilled in the art; the end result is the same" is unsupported on the record. And the wording "moist crumb" and "non-dry bread crumbs" does not appear in Bernacchi et al. Certainly Bernacchi et al distinguish between wet and dry bread crumbs.

As indicated by the literature listed on the attached paper, the bread art distinguishes between fresh bread and frozen bread as well as stale bread, between fresh bread and toasted bread, between fresh bread crumbs and toasted bread crumbs, between dry, browned and fresh bread crumbs. The prior art (see particularly *The Joy of Cooking* citation), recognizes

soaking crumbs in water and pressing the moisture out. Wet bread crumbs are not "fresh bread crumbs".

The Official Action does not support its conclusionary assertions by identified knowledge place on the record, In re Lee, 61 USPQ2d 1430, 1434, 1435, (copy attached) discussed in MPEP, Feb 1, 2003, Section 2144.03B.

It is Applicants' purpose to prepare a product by a method that avoids repeated drying and will adhere to food that is not battered. The recitation "fresh bread crumbs" serves to eliminate a drying step. The art does not achieve that result. The end result is a modified bread crumb which has not been shown to be the same as the crumbs disclosed by the art. Still, as shown in the Examples, the application to food is achieved in as desirable and effective way as when batter is used; note the discussion at pages 12, 15 and 17.

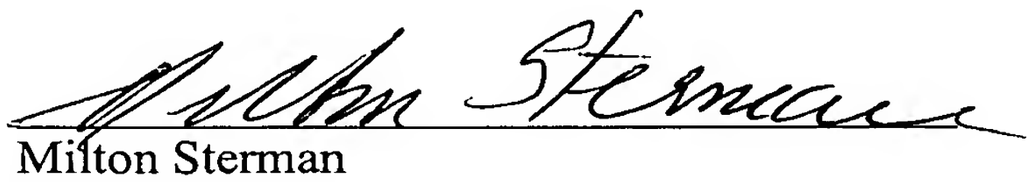
It may also be added that Bernacchi et al.'s teaching is limited to a particular and special crumb, namely one made from a special bread incorporating heat set protein. And Bernacchi et al apply their crumb to a battered comestible.

It would appear that Bernacchi et al is not appropriately combinable with Rispoli et al.

Favorable reconsideration is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Milton Sterman
Registration No. 27,499

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
MNS/rac

KIRK-OTHMER

ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY

FOURTH EDITION

EDITOR
roschwitz

EDITOR
we-Grant

VOLUME **11**

FLAVOR CHARACTERIZATION
TO
FUEL CELLS

1994

A Wiley-Interscience Publication
JOHN WILEY & SONS
New York • Chichester • Brisbane • Toronto • Singapore

laminations to retard water vapor and flavor transmission (see WHEAT AND OTHER CEREAL GRAINS).

Soft baked goods such as breads, cakes, and pastries are highly aerated structures and are subject to dehydration and staling. In moist environments, baked goods are also subject to microbiological deterioration as a result of the growth of mold and other microorganisms. To retard moisture loss, good water-vapor barriers such as coextruded polyethylene film bags or polyethylene-coated paperboard are used for packaging.

Hard baked goods such as cookies and crackers have a relatively low water and high fat content. Water can be absorbed, and the product loses its desirable texture and becomes subject to lipid rancidity. Packaging for cookies and crackers includes polyolefin-coextrusion film pouches within paperboard carton shells, and polystyrene trays overwrapped with polyethylene or oriented polypropylene film. Soft cookies are packaged in high water-vapor-barrier laminations containing aluminum foil.

Salty Snacks. Salty snacks include dry grain or potato products such as potato and corn chips, and roasted nuts (see NUTS). These snacks usually have low water content and relatively high fat content. Snack packaging problems are compounded by salt, a catalyst for lipid oxidation in the product formulations. Snacks are often packaged in pouches derived from oriented polypropylene or polyester that have low water-vapor transmission, relying on rapid and controlled product distribution to obviate fat oxidation problems. Some salty snacks are packaged under inert atmospheres in both pouches and rigid containers, such as composite cans, to extend distribution. Generally, light which catalyzes lipid oxidation harms such products, and so opaque packaging is often, but not always, employed.

Candy. Chocolate is subject to flavor or microbiological change. Inclusions such as nuts and fillings such as caramel are susceptible to water gain or loss. Chocolates, which are stable, are packaged in greaseproof papers and moisture/fat barriers such as polypropylene film (see CHOCOLATE AND COCOA).

Hard sugar candies have very low moisture content. They are sealed in low water vapor-transmission packaging such as aluminum foil or oriented polypropylene film.

Beverages. Beverages may be still or carbonated, alcoholic or nonalcoholic. The largest quantity of packaging in the United States is for two carbonated beverages, ie, beer (qv) and soft drinks (see CARBONATED BEVERAGES). Both contain dissolved carbon dioxide (qv) creating pressure within the package. The package must be capable of withstanding the internal pressure of carbon dioxide. Coated aluminum cans, and glass and polyester plastic bottles are the most used packaging for carbonated drinks.

Beer is more sensitive than other carbonated beverages to oxygen, loss of carbon dioxide, off-flavor, and light. Most American beer undergoes thermal pasteurization performed after sealing in the package. Thus, the internal pressure within the package can build to well over 690 kPa (100 psi) at 63°C (145°F), the usual pasteurization temperature. Beer and other carbonated beverages are generally packaged at relatively high speeds; therefore, the packages must be extremely uniform, free of defects, and dimensionally stable.

Heat Treatment. Shellfish taken from sewage-contaminated waters and containing pathogenic virus can be made safe by thorough cooking. Foods contaminated with large numbers of pathogenic microbes, or containing heat-labile toxins, however, are generally unsuitable for human consumption even if heat could be used to render these foods safe. Foods containing heat-stable microbial toxins, but otherwise free of microbes, are particularly hazardous because these may have no detectable signs of spoilage. Canned mushrooms have been implicated in staphylococcal food poisoning (9). Staphylococcal enterotoxin may lose only 90% of its toxicity by heating 19 min at 121°C.

Preservatives. Bakery products represent an important category of minimally processed foods. Bread and other yeast and chemically leavened baked products can lose their fresh quality characteristics within 24 h at room temperature owing to chemical changes brought about by water migration and starch crystallization. This quality loss, evidenced by staling, represents a complex set of changes among the starch, protein, water, and lipid components of the product. Additives such as sodium stearoyl lactylate can inhibit staling in bread for up to several weeks. The potential for the growth of microbes, such as molds, which can tolerate low water activity conditions, can create the need for a hurdle preservation strategy for extending the shelf life of fresh bread. Propionates as mold inhibitors or packaging in an oxygen-free modified atmosphere can prevent mold growth.

Long-Term Storage. Inactivation of microbes and enzymes in foods and food ingredients is necessary to ensure a long useful packaged shelf life. This can be achieved by using one or more preservation operations such as applying heat; using storage temperatures below −18°C; drying to water activities below 0.65, that is, an equilibrium relative humidity surrounding the product below 65%; and by adding chemical preservatives such as organic acids (acetic or lactic) or table salt. Generally, heat is used to inactivate enzyme activity prior to other preservation treatments. A mild heat treatment to inactivate enzymes in foods prior to freezing, drying, or chemical preservation is known as blanching. A discussion of the methods and equipment for blanching is available (10).

Food processing firms producing heat-preserved, frozen, dehydrated, or chemically preserved foods may be classified by their finished products. Companies may be further grouped based on whether they process raw materials into ingredients, such as in poultry and meat processing plants, or whether they take these ingredients and convert them to ready-to-eat consumer products.

Thermal Preservation Technology. The heat preservation of foods can be accomplished by various combinations of heating times and temperatures depending on the number and type of heat-resistant spores present, the composition of the food, and the physical characteristics of the food and package. Physical characteristics of the food such as viscosity, size of particles, size of the package, and starting temperature influence the rate of heat penetration into the slowest heating point in the package.

The inactivation of heat-resistant spores appears to follow first-order kinetics. Thus if the rate of inactivation of a spore population is known at several temperatures, and the rate of heating of the slowest point in a package can be determined or calculated from heat-transfer principles, then the time needed to sterilize the package can be calculated for any external heating condition. Math-

Fresh bread standards

A-A-20052B
May 11, 1998
SUPERSEDING
A-A-20052A
April 25, 1986

COMMERCIAL ITEM DESCRIPTION

BREAD, FRESH OR FROZEN

The U.S. Department of Agriculture has authorized the use of this Commercial Item Description.

1. SCOPE.

1.1 This Commercial Item Description (CID) covers fresh or frozen bread, packed in commercially acceptable containers, suitable for use by Federal, State, and local governments and other interested parties.

2. CLASSIFICATION.

2.1 The fresh or frozen bread shall conform to the type(s), style(s), product state(s), loaf size(s), bake type(s), shape(s), slice type(s), enrichment type(s), and seed type(s), in the following list which shall be specified in the solicitation, contract, or purchase order.

Types, styles, product states, loaf sizes, bake types, shapes, slice types, enrichment types, and seed types.

Type I - White, enriched

Style A - Thin
Style B - Regular
Style C - Thick (for ATexas toast@)

Type II - Whole wheat
Type III - Wheat
Type IV - Raisin
Type V - Rye
Type VI - French, white
Type VII - Pumpernickel
Type VIII - Marble (rye swirl on pumpernickel)
Type IX - Buttermilk
Type X - Italian

Style A - Seasoned with garlic and butter
Style B - Unseasoned

Type XI - White, enriched, reduced calorie
Type XII - Wheat, reduced calorie
Type XIII - Other

Product state 1 - Fresh
Product state 2 - Frozen

Loaf size a - 16 ounce
Loaf size b - 18 ounce
Loaf size c - 20 ounce
Loaf size d - 24 ounce
Loaf size e - 32 ounce
Loaf size f - Other

Bake type (i) - Pan baked
Bake type (ii) - Hearth baked

Shape (a) - Round top 1/
Shape (b) - Sandwich 1/

1/ Applicable to Types I, II, III, IV, V, XI, and XII.

Slice type (I) - Sliced
Slice type (II) - Unsliced

Enrichment type (A) - Enriched
Enrichment type (B) - Unenriched

Seed type (1) - Seeded 1/
Seed type (2) - Seedless 1/

1/ Applicable to Types V, VII, and X.

3. SALIENT CHARACTERISTICS.

3.1 Processing: The fresh or frozen bread shall be prepared in accordance with good manufacturing practice.

3.2 Ingredients: The fresh or frozen bread shall consist of flour, water, salt, yeast, emulsifiers or other stabilizers, and other ingredients appropriate for the type of bread specified in the solicitation, contract, or purchase order. The fresh or frozen bread shall include mold inhibitors of proper levels as allowed by the Federal Food, Drug and Cosmetic Act.

3.2.1 Enriched flour: When the bread is enriched, the wheat flour used for the bread shall conform to the U.S. Standards of Identity for Enriched Flour (21 CFR 137.165) and shall be milled from a variety of hard and/or soft wheat.

3.3 Finished product:

3.3.1 Appearance and color: The fresh or frozen bread shall have a uniformly brown crust characteristic of the product. The fresh or frozen bread shall have a typical volume, characteristic grain, and be evenly baked without evidence of scorching or burning. The fresh or frozen bread shall be sliced when specified. There shall be no foreign color to the product. The delivered fresh or frozen bread shall not be crushed or damaged.

3.3.2 Odor and flavor: The fresh or frozen bread shall have a flavor and aroma characteristic of the particular type of bread. There shall be no foreign odors or flavors such as, but not limited to, burnt, scorched, stale, rancid, or moldy.

3.3.3 Texture: The texture of the fresh or frozen bread shall have a characteristic texture for the type of bread. The fresh or frozen bread shall be firm, tender, uniformly brown crust character-istic of the product, except Type VI bread which shall have a firm, crisp crust. The baked product shall not contain specks of flour on the bottom of the bread.

3.3.4 Total solids content: The fresh and frozen bread total solids content of each type of bread shall be in accordance with the Standards of Identity for baked products.

3.3.5 Enrichment: The fresh and frozen bread shall have the enrichment ingredients evenly distributed in the finished product.

3.3.6 Foreign material: All ingredients shall be clean, sound, wholesome, and free from evidence of rodent or insect infestation.

3.4 Age requirement: Unless otherwise specified in the solicitation, contract, or purchase order, the fresh bread shall be delivered within 48 hours after baking. When frozen bread is specified, the fresh product shall be in a freezer within 6 hours after baking and frozen to a temperature of 0EF (-17.8EC), " 5EF (± 15EC) and shall be at a temperature not higher than
10EF (-12.2EC) within 6 hours after being placed in the freezer. Unless otherwise specified in the solicitation, contract, or purchase order, the frozen bread shall be manufactured not more than 90 days prior to delivery and shall not have exceeded 10EF (-12.2EC) at any time during storage and delivery.

4. REGULATORY REQUIREMENTS.

4.1 The delivered fresh or frozen bread shall comply with all applicable Federal, State, and local mandatory requirements and regulations relating to the preparation, packaging, labeling, storage, distribution, and sale of the fresh or frozen bread within the commercial marketplace. Delivered fresh or frozen bread shall comply with all applicable provisions of the Federal Food, Drug, and Cosmetic Act and regulations promulgated thereunder.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The fresh or frozen bread provided shall meet the salient characteristics of this CID, conform to the producer's own specifications, standards, and quality assurance practices, and be the same fresh or frozen bread offered for sale in the commercial market. The Government reserves the right to require proof of such conformance.

5.2 Quality assurance. When required in the solicitation, contract, or purchase order, the Federal Grain Inspection Service (FGIS), U.S. Department of Agriculture, shall determine the quality assurance of the fresh or frozen bread according to the requirements of this CID or applicable standards or specifications. The fresh or frozen bread shall be examined or analyzed in accordance with applicable provisions in this CID, solicitation, contract, or purchase order, and, when applicable, the United States Standards for Condition of Food Containers in effect on the date of the solicitation.

6. PACKAGING.

6.1 Preservation, packaging, packing, labeling, and case marking. Preservation, packaging,

packing, labeling, and case marking shall be as specified in the solicitation, contract, or purchase order.

7. NOTES.

7.1 Purchasers shall specify:

- Type(s), style(s), product state(s), loaf size(s), bake type(s), shape(s), slice type(s), enrichment(s), seed type(s), of bread as required.

7.2 Sources of documents.

7.2.1 Sources of information for governmental documents are as follows:

Applicable provisions of the Federal Food, Drug, and Cosmetic Act are contained in 21 CFR Parts 1 to 199. This document may be purchased from: **Superintendent of Documents, New Orders, P.O. Box 371954, Pittsburgh, PA 15250-7954.** Credit card (MasterCard or Visa) purchases may be made by calling the Superintendent of Documents on (202) 512-1800.

Copies of the United States Standards for Condition of Food Containers are available from: **Chairperson, Condition of Container Committee, STOP 0243, 1400 Independence Avenue, SW, Washington, DC 20250-0243.**

Civil agencies and other interested parties may obtain copies of this CID from: **General Services Administration, Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407.**

Military activities should submit requests for copies of this CID to: **Standardization Documents Order Desk, Defense Automation Printing Service, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.**

MILITARY INTERESTS:

Custodians

Army - GL
Navy - SA
Air Force - 35

Review Activities

Army - MD, QM
Navy - MC

CIVIL AGENCY COORDINATING ACTIVITIES:

DOJ - BOP
HHS - NIH, IHS
USDA - FV
VA - OSS

PREPARING ACTIVITY:

DLA - SS

(Project No. 8920-P025)

M Sterman

NUTRITIVE VALUE OF AMERICAN FOODS

In Common Units

BY CATHERINE F. ADAMS

Agriculture Handbook No. 456

Agricultural Research Service

UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D.C. Issued November 1975.

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

TABLE 1.—*Nutritive values for household measures and market units of foods*—Continued

[Item numbers correspond to those in table 1 of Handbook No. 8, revised 1963. Values in parentheses denote imputed values usually from another form of the food or from a similar food. Zeros in parentheses indicate that amount of a constituent, if present, is probably too small to be measured. Dashes (—) denote lack of reliable data for a constituent believed to be present in a measurable amount. Calculated values, as those based on a recipe, are not in parentheses]

Item No.	Food, approximate measures, units, and weight (edible part unless footnotes indicate otherwise)		Values for edible part of foods: Water	Food energy	Protein	Fat	Carbohydrate	Calcium	Phosphorus	Iron	Sodium	Potassium	Vitamin A value	Thiamin	Riboflavin	Niacin	Ascorbic acid
(A)	(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
			Grams	*Percent*	*Calories*	*Grams*	*Grams*	*Grams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*International units*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*
	Boysenberries—Continued																
	Frozen, not thawed:																
436	Unsweetened:																
a	Container, net wt., 10 oz	1 container	284	86.8	136	3.4	0.9	32.4	71	68	4.5	3	435	(480)	0.06	0.37	2.8	37
b	Cup	1 cup	126	86.8	60	1.5	.4	14.4	32	30	2.0	1	193	(210)	.03	.16	1.3	16
c	Pound	1 lb	454	86.8	218	5.4	1.4	51.7	113	109	7.3	5	694	(770)	.09	.59	4.5	59
437	Sweetened with nutritive sweetener:																
a	Container, net wt., 10 oz	1 container	284	74.3	273	2.3	.9	69.3	48	48	1.7	3	298	(400)	.06	.28	1.7	23
b	Cup	1 cup	143	74.3	137	1.1	.4	34.9	24	24	.9	1	150	(200)	.03	.14	.9	11
c	Pound	1 lb	454	74.3	435	3.6	1.4	110.7	77	77	2.7	5	476	(640)	.09	.45	2.7	36
	Bran:[5 74]																
439	Added sugar, salt, malt extract, vitamins	1 cup	60	3.6	144	7.6	1.8	44.6	[75] 50	[75] 598	[75] 5.8	[73] 493	[73] 466	[83] 2,820	([78])	([77])	([78])	([78])
440	Added sugar, salt, defatted wheat germ, vitamins	1 cup	75	3.0	179	8.1	1.4	59.1	55	[80] 536	.6	388	[80] 355	[81] 3,530	[83] .87	[83] 1.06	[83] 8.7	[81] 26
441	**Bran flakes (40% bran), added sugar, salt, iron, vitamins.**[5 74]	1 cup	35	3.0	106	3.6	.6	28.2	[83] 19	[83] 125	[83] 12.4	[83] 207	[83] 137	[81] 1,650	[83] .41	[83] .49	[83] 4.1	[81] 12
442	**Bran flakes with raisins, added sugar, salt, iron, vitamins.**[5 74]	1 cup	50	7.3	144	4.2	.7	39.7	28	[81] 146	[83] 17.7	[83] 212	[83] 154	[81] 2,350	[83] .58	[83] .71	[83] 5.8	[81] 18
	Braunschweiger. See Sausage, cold cuts, and luncheon meats (item 1986).																
443	**Brazil nuts:**[5]																
	In shell (refuse: shells, 52%):[1]																
a	Cup (approx. 13½ large nuts, diam. greater than 7³⁄₆₄ in.).	1 cup	122	4.6	383	8.4	39.2	6.4	109	406	2.0	1	419	Trace	.56	.07	.9	—
b	Pound (approx. 45 extra large nuts, diam. greater than 7⁸⁄₆₄ in.: 50 large, diam. greater than 7³⁄₆₄ in.: 57 medium, diam. greater than 5⁹⁄₆₄ in.; yields approx. 1½ cups, large shelled nuts).	1 lb	454	4.6	1,424	31.1	145.6	23.7	405	1,509	7.4	2	1,557	Trace	2.09	.26	3.5	—
c	Ounce (approx. 3 extra large or large nuts or 3½ medium).	1 oz. or 3–3½ nuts.	28	4.6	89	1.9	9.1	1.5	25	94	.5	Trace	97	Trace	.13	.02	.2	—
	Shelled:																	
d	Cup (approx. 32 large kernels)	1 cup	140	4.6	916	20.0	93.7	15.3	260	970	4.8	1	1,001	Trace	1.34	.17	2.2	—
e	Pound (approx. 94 extra large, 103 large, or 133 medium kernels; yield from approx. 2.1 lb., in shell).	1 lb	454	4.6	2,967	64.9	303.5	49.4	844	3,143	15.4	5	3,243	Trace	4.35	.54	7.3	—
f	Ounce (approx. 6 extra large or large kernels or 8 medium).	1 oz. or 6–8 kernels.	28	4.6	185	4.1	19.0	3.1	53	196	1.0	Trace	203	Trace	.27	.03	.5	—
	Breads:[86]																	
	Cracked-wheat bread:[5 84]																	
444	Fresh:																	
a	Loaf, net wt., 16 oz. (1 lb.); approx. 18 slices (item 444b).	1 loaf or 1 lb	454	34.9	1,193	39.5	10.0	236.3	399	581	5.0	2,400	608	Trace	.53	.41	5.9	Trace
b	Slice, 4 in. wide, 4¼ in. high, ⁹⁄₁₆ in. thick; ¹⁄₁₈ of loaf.	1 slice	25	34.9	66	2.2	.6	13.0	22	32	.3	132	34	Trace	.03	.02	.3	Trace
445	Toasted slices:																	
a	Yield from 1-lb. loaf	18 slices	381	22.5	1,193	39.5	10.0	236.3	399	581	5.0	2,400	608	Trace	.42	.41	5.9	Trace
b	Piece	1 slice	21	22.5	66	2.2	.6	13.0	22	32	.3	132	34	Trace	(.03)	.02	.3	Trace
c	Pound	1 lb	454	22.5	1,420	47.2	11.8	281.2	476	689	5.9	2,858	726	Trace	.50	.50	6.8	Trace
446	French or vienna bread and rolls, enriched:																	
	Bread:																	
a	Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	30.6	1,315	41.3	13.6	251.3	195	386	10.0	2,631	408	Trace	1.27	1.00	11.3	Trace
	Slice:																	
	French:																	
b	Piece, 5 in. wide, 2½ in. high, 1 in. thick	1 slice	35	30.6	102	3.2	1.1	19.4	15	30	.8	203	32	Trace	.10	.08	.9	Trace
c	Piece, 2½ in. wide, 2 in. high, ½ in. thick	1 slice	15	30.6	44	1.4	.5	8.3	6	13	.3	87	14	Trace	.04	.03	.4	Trace
	Vienna:																	
d	Piece, 4¾ in. wide, 4 in. high, ½ in. thick	1 slice	25	30.6	73	2.3	.8	13.9	11	21	.6	145	23	Trace	.07	.06	.6	Trace
e	Roll, hoagie, or submarine, 11½ in. long, 3 in. wide, 2½ in. thick.	1 roll	135	30.6	392	12.3	4.1	74.8	58	115	3.0	783	122	Trace	.38	.30	3.4	Trace
448	French or vienna bread and rolls, unenriched:																	
	Bread:																	

(A)		(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
	a	Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	30.6	1,315	41.3	13.6	251.3	195	386	3.2	2,631	408	Trace	0.36	0.36	3.6	Trace
		Slice:																	
		French:																	
	b	Piece, 5 in. wide, 2½ in. high, 1 in. thick	1 slice	35	30.6	102	3.2	1.1	19.4	15	30	.2	203	32	Trace	.03	.03	.3	Trace
	c	Piece, 2½ in. wide, 2 in. high, ½ in. thick	1 slice	15	30.6	44	1.4	.5	8.3	6	13	.1	87	14	Trace	.01	.01	.1	Trace
		Vienna:																	
	d	Piece, 4¾ in. wide, 4 in. high, ½ in. thick	1 slice	25	30.6	73	2.3	.8	13.9	11	21	.2	145	23	Trace	.02	.02	.2	Trace
	e	Roll, hoagie, or submarine, 11½ in. long, 3 in. wide, 2½ in. thick.	1 roll	135	30.6	392	12.3	4.1	74.8	58	115	.9	783	122	Trace	.11	.11	1.1	Trace
		Italian bread:																	
450		Enriched:																	
		Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	31.8	1,252	41.3	3.6	255.8	77	349	10.0	2,654	336	(0)	1.32	.91	11.8	(0)
	a	Slice, 4½ in. wide, 3¼ in. high, ¾ in. thick, or 7¼ in. wide, 3⅞ in. high, 7/16 in. thick.	1 slice	30	31.8	83	2.7	.2	16.9	5	23	.7	176	22	(0)	.09	.06	.8	(0)
	b	Slice, 3¼ in. wide, 2½ in. high, ½ in. thick	1 slice	10	31.8	28	.9	.1	5.6	2	8	.2	59	7	(0)	.03	.02	.3	(0)
451		Unenriched:																	
		Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	31.8	1,252	41.3	3.6	255.8	77	349	3.2	2,654	336	(0)	.41	.27	3.6	(0)
	a	Slice, 4½ in. wide, 3¼ in. high, ¾ in. thick, or 7¼ in. wide, 3⅞ in. high, 7/16 in. thick.	1 slice	30	31.8	83	2.7	.2	16.9	5	23	.2	176	22	(0)	.03	.02	.2	(0)
	b	Slice, 3¼ in. wide, 2½ in. high, ½ in. thick	1 slice	10	31.8	28	.9	.1	5.6	2	8	.1	59	7	(0)	.01	.01	.1	(0)
		Raisin bread: [14]																	
452		Fresh:																	
		Loaf, net wt., 16 oz. (1 lb.); approx. 18 slices (item 452b).	1 loaf or 1 lb	454	35.3	1,188	29.9	12.7	243.1	322	395	5.9	1,656	1,057	Trace	.23	.41	3.2	Trace
	b	Slice, 3¾ in. wide, 3⅝ in. high, ½ in. thick; 1/18 of loaf.	1 slice	25	35.3	66	1.7	.7	13.4	18	22	.3	91	58	Trace	.01	.02	.2	Trace
453		Toasted slices:																	
		Yield from 1-lb. loaf	18 slices	376	22.0	1,188	29.9	12.7	243.1	322	395	5.9	1,656	1,057	Trace	.19	.41	3.2	Trace
	a	Piece	1 slice	21	22.0	66	1.7	.7	13.4	18	22	.3	91	58	Trace	(.01)	.02	.2	Trace
	b	Pound	1 lb	454	22.0	1,433	36.3	15.4	293.0	390	476	7.3	1,996	1,275	Trace	.23	.50	3.6	Trace
	c	Rye bread: [5]																	
		American (⅔ wheat flour, ⅓ rye flour):																	
454		Fresh:																	
		Regular size:																	
		Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	35.5	1,102	41.3	5.0	236.3	340	667	7.3	2,527	658	(0)	.82	.32	6.4	(0)
	a	Slice, 4¾ in. wide, 3¾ in. high, 7/16 in. thick.	1 slice	25	35.5	61	2.3	.3	13.0	19	37	.4	139	36	(0)	.05	.02	.4	(0)
	b	Snack size:																	
		Loaf, net wt., 8 oz	1 loaf	227	35.5	552	20.7	2.5	118.3	170	334	3.6	1,264	329	(0)	.41	.16	3.2	(0)
	c	Slice, 2½ in. wide, 2 in. high, ¼ in. thick	1 slice	7	35.5	17	.6	.1	3.6	5	10	.1	39	10	(0)	.01	Trace	.1	(0)
	d	Toasted slices (regular size):																	
		Piece	1 slice	22	25.0	61	2.3	.3	13.0	19	37	.4	139	36	(0)	.04	.02	.4	(0)
455		Pound	1 lb	454	25.0	1,279	48.1	5.9	274.4	395	776	8.6	2,939	767	(0)	.77	.36	7.3	(0)
	a	Pumpernickel:																	
	b	Regular size:																	
456		Loaf, net wt., 16 oz. (1 lb.)	1 loaf or 1 lb	454	34.0	1,116	41.3	5.4	240.9	381	1,039	10.9	2,581	2,059	(0)	1.04	.64	5.4	(0)
	a	Slice, 5 in. wide, 4 in. high, ⅜ in. thick	1 slice	32	34.0	79	2.9	.4	17.0	27	73	.8	182	145	(0)	.07	.04	.4	(0)
	b	Snack size:																	
		Loaf, net wt., 8 oz	1 loaf	227	34.0	558	20.7	2.7	120.5	191	520	5.4	1,292	1,031	(0)	.52	.32	2.7	(0)
	c	Slice, 2½ in. wide, 2 in. high, ¼ in. thick	1 slice	7	34.0	17	.6	.1	3.7	6	16	.2	40	32	(0)	.02	.01	.1	(0)
	d	Salt-rising bread, unenriched: [16]																	
457		Fresh:																	
		Loaf, net wt., 16 oz. (1 lb.); approx. 19 slices (item 457b).	1 loaf or 1 lb	454	36.5	1,211	35.8	10.9	236.8	104	313	2.7	1,202	304	50	.20	.23	2.7	Trace
	a	Slice, 4⅛ in. wide, 4½ in. high, 7/16 in. thick; 1/20 of loaf.	1 slice	24	36.5	64	1.9	.6	12.5	6	17	.1	64	16	Trace	.01	.01	.1	Trace
	b	Toasted slices:																	
458		Yield from 1-lb. loaf	19 slices	408	29.4	1,211	35.8	10.9	236.8	104	313	2.7	1,202	304	50	.16	.23	2.7	Trace
	a																		

[1] Measure and weight apply to food as it is described with inedible part or parts (refuse) included.

[5] Most of phosphorus in nuts, legumes, and outer layers of cereal grains is present as phytic acid. See also Appendix D, section on Minerals and Oxalic Acid, p. 284.

[14] For further information, see Appendix B, section on Breads, p. 270, and Appendix C, section on Enriched Foods and Standards of Enrichment, p. 273, and section on Breads, p. 276.

[16] Weight per cup based on method of pouring product from container into measuring cup to overflow and leveling with straight edge. Revised values for minerals and vitamins apply to products on the market in 1972.

[11] Based on revised value per 100 g. of product. Value used for calcium is 84 mg.; for phosphorus, 997 mg.; for iron, 9.7 mg.; for sodium, 822 mg.; for potassium, 776 mg.; for vitamin A, 4,700 I.U. for product with added vitamin A. Without added vitamin A, value is (0).

[12] With added thiamin, values range from 1.16 to 3.53 mg. per 100 g.; 0.70–2.12 mg. per cup.

[13] With added riboflavin, values range from 1.41 to 4.23 mg. per 100 g.; 0.85–2.54 mg. per cup.

[15] With added niacin, values range from 11.6 to 35.3 mg. per 100 g.; 7.0–21.2 mg. per cup.

[17] With added ascorbic acid, values range from 35 to 106 mg. per 100 g.; 21–64 mg. per cup.

[10] Based on revised value per 100 g. of product. Value used for phosphorus is 714 mg.; for potassium, 473 mg.

[11] Basis of revised value for 100 g. of product with added vitamin A is 4,700 I.U.; with added ascorbic acid, 35 mg.

[12] Basis of revised value for 100 g. of product with added thiamin is 1.16 mg.; with added riboflavin, 1.41 mg.; with added niacin, 11.6 mg.

[13] Based on revised value per 100 g. of product. Values used for item 441 are calcium 53 mg., phosphorus 357 mg., iron 35.3 mg., sodium 590 mg., potassium 390 mg. Values used for item 442 are phosphorus 291 mg., iron 35.3 mg., sodium 423 mg., potassium 307 mg.

[14] Count per loaf, both fresh and toasted, includes end slices. Dimensions of slice are for center slice.

TABLE 1.—*Nutritive values for household measures and market units of foods*—Continued

[Item numbers correspond to those in table 1 of Handbook No. 8, revised 1963. Values in parentheses denote imputed values usually from another form of the food or from a similar food. Zeros in parentheses indicate that amount of a constituent, if present, is probably too small to be measured. Dashes (—) denote lack of reliable data for a constituent believed to be present in a measurable amount. Calculated values, as those based on a recipe, are not in parentheses]

Item No.	Food, approximate measures, units, and weight (edible part unless footnotes indicate otherwise)		Values for edible part of foods														
			Water	Food energy	Protein	Fat	Carbohydrate	Calcium	Phosphorus	Iron	Sodium	Potassium	Vitamin A value	Thiamin	Riboflavin	Niacin	Ascorbic acid
(A)	(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
		Grams	*Percent*	*Calories*	*Grams*	*Grams*	*Grams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*International units*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*
	Breads [25]—Continued																
	Salt-rising bread, unenriched [64]—Continued																
	Toasted slices—Continued																
b	Piece	1 slice	22	29.4	64	1.9	0.6	12.5	6	17	0.1	64	16	Trace	(0.01)	0.01	0.1	Trace
c	Pound	1 lb	454	29.4	1,347	39.9	12.2	263.1	118	349	3.2	1,334	336	50	.17	.23	2.7	Trace
	White bread, enriched, soft-crumb type (made by continuous mix or conventional method): [64 65]																
461	Fresh:																
a	Loaf, net wt., 24 oz. (1 lb. 8 oz.); approx. 24 regular slices (item 461b) or 28 thin slices (sandwich type) (item 461c).	1 loaf	680	35.6	1,836	59.2	21.8	343.4	571	660	17.0	3,448	714	Trace	1.70	1.48	16.3	Trace
	Slice:																
b	Regular, 4⅜ in. wide, 4 in. high, 9/16 in. thick; 1/24 of loaf.	1 slice	28	35.6	76	2.4	.9	14.1	24	27	.7	142	29	Trace	.07	.06	.7	Trace
c	Thin (sandwich type), 4 in. wide, 3⅞ in. high, ½ in. thick; 1/28 of loaf.	1 slice	24	35.6	65	2.1	.8	12.1	20	23	.6	122	25	Trace	.06	.05	.6	Trace
d	Loaf, net wt., 16 oz. (1 lb.); approx. 18 regular slices (item 461e) or 22 thin slices (item 461f).	1 loaf or 1 lb	454	35.6	1,225	39.5	14.5	229.1	381	440	11.3	2,300	476	Trace	1.13	.95	10.9	Trace
	Slice:																
e	Regular, 4 in. wide, 4¼ in. high, 9/16 in. thick; 1/18 of loaf.	1 slice	25	35.6	68	2.2	.8	12.6	21	24	.6	127	26	Trace	.06	.05	.6	Trace
f	Thin, 4 in. wide, 4 in. high, 7/16 in. thick; 1/22 of loaf.	1 slice	20	35.6	54	1.7	.6	10.1	17	19	.5	101	21	Trace	.05	.04	.5	Trace
g	Cubes	1 cup	30	35.6	81	2.6	1.0	15.2	25	29	.8	152	32	Trace	.08	.06	.7	Trace
h	Crumbs	1 cup	45	35.6	122	3.9	1.4	22.7	38	44	1.1	228	47	Trace	.11	.09	1.1	Trace
462	Toasted slices:																
	From 1½-lb. loaf:																
a	Yield from loaf	24 regular or 28 thin slices.	585	25.1	1,836	59.2	21.8	343.4	571	660	17.0	3,448	714	Trace	1.35	1.43	16.3	Trace
b	Slice, regular	1 slice	24	25.1	76	2.4	.9	14.1	24	27	.7	142	29	Trace	.06	.06	.7	Trace
c	Slice, thin (sandwich type)	1 slice	21	25.1	65	2.1	.8	12.1	20	23	.6	122	25	Trace	.05	.05	.6	Trace
	From 1-lb. loaf:																
d	Yield from loaf	18 regular or 22 thin slices.	390	25.1	1,225	39.5	14.5	229.1	381	440	11.3	2,300	476	Trace	.90	.95	10.9	Trace
e	Slice, regular	1 slice	22	25.1	68	2.2	.8	12.6	21	24	.6	127	26	Trace	.05	.05	.6	Trace
f	Slice, thin (sandwich type)	1 slice	17	25.1	54	1.7	.6	10.1	17	19	.5	101	21	Trace	.04	.04	.5	Trace
g	Pound	1 lb	454	25.1	1,424	45.8	16.8	266.7	445	513	13.2	2,676	553	Trace	1.04	1.09	12.7	Trace
	White bread, enriched, firm-crumb type (made by conventional method): [64 65]																
463	Fresh:																
a	Loaf, net wt., 32 oz. (2 lb.); approx. 34 thin slices (item 463b).	1 loaf or 2 lb	907	35.0	2,494	81.6	34.5	455.3	871	925	22.7	4,490	1,097	Trace	2.45	1.81	21.8	Trace
b	Slice, 3⅝ in. wide, 4¼ in. high, 7/16 in. thick; 1/34 of loaf.	1 slice	27	35.0	74	2.4	1.0	13.6	26	28	.7	134	33	Trace	.07	.05	.6	Trace
c	Loaf, net wt., 16 oz. (1 lb.); approx. 20 thin slices (item 463d) or 31 slices (item 463e).	1 loaf or 1 lb	454	35.0	1,247	40.8	17.2	227.7	435	463	11.3	2,245	549	Trace	1.22	.91	10.9	Trace
d	Slice, 3¾ in. wide, 4 in. high, 7/16 in. thick; 1/20 of loaf.	1 slice	23	35.0	63	2.1	.9	11.5	22	23	.6	114	28	Trace	.06	.05	.6	Trace
e	Slice, 3¾ in. wide, 4 in. high, ¼ in. thick; 1/30 of loaf.	1 slice	15	35.0	41	1.4	.6	7.5	14	15	.4	74	18	Trace	.04	.03	.4	Trace
f	Cubes	1 cup	30	35.0	83	2.7	1.1	15.1	29	31	.8	149	36	Trace	.08	.06	.7	Trace
g	Crumbs	1 cup	45	35.0	124	4.1	1.7	22.6	43	46	1.1	223	54	Trace	.12	.09	1.1	Trace
464	Toasted slices:																
	From 2-lb. loaf:																
a	Yield from loaf	34 slices	780	24.4	2,494	81.6	34.5	455.3	871	925	22.7	4,490	1,097	Trace	1.95	1.81	21.8	Trace
b	Slice	1 slice	23	24.4	74	2.4	1.0	13.6	26	28	.7	134	33	Trace	.06	.05	.6	Trace
	From 1-lb. loaf (20 slices):																
c	Yield from loaf	20 slices	390	24.4	1,247	40.8	17.2	227.7	435	463	11.3	2,245	549	Trace	.98	.91	10.9	Trace
d	Slice	1 slice	20	24.4	63	2.1	.9	11.5	22	23	.6	114	28	Trace	.05	.05	.6	Trace
	White bread, unenriched, soft-crumb type (made by continuous mix or conventional method): [64 65]																

(A)	(B)		(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
467	Fresh:																
a	Loaf, net wt., 24 oz. (1 lb. 8 oz.); approx. 24 regular slices (item 467b) or 28 thin slices (sandwich type) (item 467c).	1 loaf	680	35.6	1,836	59.2	21.8	343.4	571	660	4.8	3,448	714	Trace	0.46	0.58	7.5	Trace
	Slice:																
b	Regular, 4⅜ in. wide, 4 in. high, 9/16 in. thick; 1/24 of loaf.	1 slice	28	35.6	76	2.4	.9	14.1	24	27	.2	142	29	Trace	.02	.03	.3	Trace
c	Thin (sandwich type), 4 in. wide, 3⅞ in. high, ½ in. thick; 1/28 of loaf.	1 slice	24	35.6	65	2.1	.8	12.1	20	23	.2	122	25	Trace	.02	.02	.3	Trace
d	Loaf, net wt., 16 oz. (1 lb.); approx. 18 regular slices (item 467e) or 22 thin slices (item 467f).	1 loaf or 1 lb	454	35.6	1,225	39.5	14.5	229.1	381	440	3.2	2,300	476	Trace	.31	.39	5.0	Trace
	Slice:																
e	Regular, 4 in. wide, 4¼ in. high, 9/16 in. thick; 1/18 of loaf.	1 slice	25	35.6	68	2.2	.8	12.6	21	24	.2	127	26	Trace	.02	.02	.3	Trace
f	Thin, 4 in. wide, 4 in. high, 7/16 in. thick; 1/22 of loaf.	1 slice	20	35.6	54	1.7	.6	10.1	17	19	.1	101	21	Trace	.01	.02	.2	Trace
g	Cubes	1 cup	30	35.6	81	2.6	1.0	15.2	25	29	.2	152	32	Trace	.02	.03	.3	Trace
h	Crumbs	1 cup	45	35.6	122	3.9	1.4	22.7	38	44	.3	228	47	Trace	.03	.04	.5	Trace
468	Toasted slices:																
	From 1½-lb. loaf:																
a	Yield from loaf	24 regular or 28 thin slices.	585	25.1	1,836	59.2	21.8	343.4	571	660	4.8	3,448	714	Trace	(.02)	.02	.3	Trace
b	Slice, regular	1 slice	24	25.1	76	2.4	.9	14.1	24	27	.2	142	29	Trace	(.02)	.02	.3	Trace
c	Slice, thin (sandwich type)	1 slice	21	25.1	65	2.1	.8	12.1	20	23	.2	122	25	Trace	(.02)	.02	.3	Trace
	From 1-lb. loaf:																
d	Yield from loaf	18 regular or 22 thin slices.	390	25.1	1,225	39.5	14.5	229.1	381	440	3.2	2,300	476	Trace	.25	.39	5.0	Trace
e	Slice, regular	1 slice	22	25.1	68	2.2	.8	12.6	21	24	.2	127	26	Trace	(.02)	.02	.3	Trace
f	Slice, thin (sandwich type)	1 slice	17	25.1	54	1.7	.6	10.1	17	19	.1	101	21	Trace	.01	.02	.2	Trace
g	Pound	1 lb	454	25.1	1,424	45.8	16.8	266.7	445	513	3.6	2,676	553	Trace	.29	.45	5.9	Trace
	White bread, unenriched, firm-crumb type (made by conventional method): [84 85]																
469	Fresh:																
a	Loaf, net wt., 32 oz. (2 lb.); approx. 34 thin slices (item 469b).	1 loaf or 2 lb	907	35.0	2,494	81.6	34.5	455.3	871	925	6.3	4,490	1,097	Trace	.64	1.17	8.2	Trace
b	Slice, 3⅝ in. wide, 4¼ in. high, 7/16 in. thick; 1/34 of loaf.	1 slice	27	35.0	74	2.4	1.0	13.6	26	28	.2	134	33	Trace	.02	.03	.2	Trace
c	Loaf, net wt., 16 oz. (1 lb.); approx. 20 thin slices (item 469d).	1 loaf or 1 lb	454	35.0	1,247	40.8	17.2	227.7	435	468	3.2	2,245	549	Trace	.32	.59	4.1	Trace
d	Slice, 3¾ in. wide, 4 in. high, 7/16 in. thick; 1/20 of loaf.	1 slice	23	35.0	63	2.1	.9	11.5	22	23	.2	114	28	Trace	.02	.03	.2	Trace
e	Cubes	1 cup	30	35.0	83	2.7	1.1	15.1	29	31	.2	149	36	Trace	.02	.04	.3	Trace
f	Crumbs	1 cup	45	35.0	124	4.1	1.7	22.6	43	46	.3	223	54	Trace	.03	.06	.4	Trace
470	Toasted slices:																
	From 2-lb. loaf:																
a	Yield from loaf	34 slices	780	24.4	2,494	81.6	34.5	455.3	871	925	6.3	4,490	1,097	Trace	.51	1.17	8.2	Trace
b	Slice	1 slice	23	24.4	74	2.4	1.0	13.6	26	28	.2	134	33	Trace	(.02)	.03	.2	Trace
	From 1-lb. loaf:																
c	Yield from loaf	20 slices	390	24.4	1,247	40.8	17.2	227.7	435	468	3.2	2,245	549	Trace	.26	.59	4.1	Trace
d	Slice	1 slice	20	24.4	63	2.1	.9	11.5	22	23	.2	114	28	Trace	(.02)	.03	.2	Trace
	Whole-wheat bread, firm-crumb type: [84 86]																
471	Fresh:																
a	Loaf, net wt., 16 oz. (1 lb.); rounded top, approx. 18 slices; flat top or sandwich style, approx. 20 slices.	1 loaf or 1 lb	454	36.4	1,102	47.6	13.6	216.4	449	1,034	13.6	2,390	1,238	Trace	1.17	.54	12.7	Trace
b	Slice, rounded top, 4 in. wide, 4 in. high, 7/16 in. thick; 1/18 of loaf.	1 slice	25	36.4	61	2.6	.8	11.9	25	57	.8	132	68	Trace	.06	.03	.7	Trace
c	Slice, flat top or sandwich style, 3⅞ in. wide, 3⅝ in. high, 7/16 in. thick; 1/20 of loaf.	1 slice	23	36.4	56	2.4	.7	11.0	23	52	.7	121	63	Trace	.06	.03	.6	Trace
472	Toasted slices:																
	Yield from 1-lb. loaf	18 or 20 slices	381	24.3	1,102	47.6	13.6	216.4	449	1,034	13.6	2,390	1,238	Trace	.93	.54	12.7	Trace
a	Piece, rounded top	1 slice	21	24.3	61	2.6	.8	11.9	25	57	.8	132	68	Trace	.05	.03	.7	Trace
b	Piece, flat top or sandwich style	1 slice	19	24.3	56	2.4	.7	11.0	23	52	.7	121	63	Trace	.05	.03	.6	Trace
c	Pound	1 lb	454	24.3	1,311	56.7	16.3	257.2	535	1,229	16.3	2,844	1,474	Trace	1.11	.68	15.4	Trace
d	Whole-wheat bread, soft-crumb type: [84 86]																

[1] Most of phosphorus in nuts, legumes, and outer layers of cereal grains is present as phytic acid. See also Appendix D, section on Minerals and Oxalic Acid, p. 284.

[84] For further information, see Appendix B, section on Breads, p. 270, and Appendix C, section on Enriched Foods and Standards of Enrichment, p. 273, and section on Breads, p. 276.

[85] Count per loaf, both fresh and toasted, includes end slices. Dimensions of slice are for center slice.

[86] For definition of terms "soft-crumb" and "firm-crumb," see Appendix B, section on Breads, p. 270.

TABLE 1.—*Nutritive values for household measures and market units of foods*—Continued

[Item numbers correspond to those in table 1 of Handbook No. 8, revised 1963. Values in parentheses denote imputed values usually from another form of the food or from a similar food. Zeros in parentheses indicate that amount of a constituent, if present, is probably too small to be measured. Dashes (—) denote lack of reliable data for a constituent believed to be present in a measurable amount. Calculated values, as those based on a recipe, are not in parentheses]

Item No.	Food, approximate measures, units, and weight (edible part unless footnotes indicate otherwise)			Values for edible part of foods														
				Water	Food energy	Protein	Fat	Carbohydrate	Calcium	Phosphorus	Iron	Sodium	Potassium	Vitamin A value	Thiamin	Riboflavin	Niacin	Ascorbic acid
(A)	(B)			(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)
			Grams	*Percent*	*Calories*	*Grams*	*Grams*	*Grams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*	*International units*	*Milligrams*	*Milligrams*	*Milligrams*	*Milligrams*
	Breads[36]—Continued																	
	Whole-wheat bread, soft-crumb type[64 65]—Continued																	
473	Fresh:																	
a	Loaf, net wt., 16 oz. (1 lb.); approx. 16 slices (item 473b).	1 loaf or 1 lb	454	36.4	1,093	41.3	11.8	223.6	381	1,152	13.6	2,404	1,161	Trace	1.37	0.45	12.7	Trace
b	Slice, 4⅛ in. wide, 3⅝ in. high, 9/16 in. thick; 1/16 of loaf.	1 slice	28	36.4	67	2.6	.7	13.8	24	71	.8	148	72	Trace	.09	.03	.8	Trace
474	Toasted slices:																	
a	Yield from 1-lb. loaf	16 slices	381	24.3	1,093	41.3	11.8	223.6	381	1,152	13.6	2,404	1,161	Trace	1.10	.45	12.7	Trace
b	Piece	1 slice	24	24.3	67	2.6	.7	13.8	24	71	.8	148	72	Trace	.07	.03	.8	Trace
c	Pound	1 lb	454	24.3	1,302	49.0	14.1	266.3	454	1,370	16.3	2,862	1,383	Trace	1.31	.54	15.0	Trace
	See also Biscuits; Boston brown bread; Cornbread; Muffins; Rolls; Salt sticks.																	
475	**Breadcrumbs, dry, grated (enriched)**	1 cup	100	6.5	392	12.6	4.6	73.4	122	141	3.6	736	152	Trace	.22	.30	3.5	Trace
	Breadcrumbs and cubes, soft. See White bread (items 461g, 461h, 463f, 463g, 467g, 467h, 469e, 469f).																	
476	**Bread pudding with raisins (made with enriched bread).**[12 13]	1 cup	265	58.6	496	14.8	16.2	75.3	289	302	2.9	533	570	800	.16	.50	1.3	3
	Bread sticks. See Salt sticks, regular type (item 1965).																	
	Bread stuffing mix and stuffings prepared from mix:																	
477	Mix, dry form:																	
a	Package, net wt., 8 oz	1 pkg	227	6.3	842	29.3	8.6	164.3	281	429	7.3	3,021	390	Trace	.50	.59	7.8	Trace
	Cup:																	
b	Coarse crumbs	1 cup	70	6.3	260	9.0	2.7	50.7	87	132	2.2	932	120	Trace	.15	.18	2.2	Trace
c	Cubes	1 cup	30	6.3	111	3.9	1.1	21.7	37	57	1.0	399	52	Trace	.07	.08	1.0	Trace
478	Stuffing:																	
	Dry, crumbly; prepared with water, table fat:																	
a	Cup	1 cup	140	33.2	501	9.1	30.5	49.8	92	136	2.2	1,254	126	910	.13	.17	2.1	Trace
b	Pound	1 lb	454	33.2	1,624	29.5	98.9	161.5	299	440	7.3	4,064	408	2,950	.41	.54	6.8	Trace
479	Moist; prepared with water, egg, table fat:																	
a	Cup	1 cup	200	61.4	416	8.8	25.6	39.4	80	132	2.0	1,008	116	840	.10	.18	1.6	Trace
b	Pound	1 lb	454	61.4	943	20.0	58.1	89.4	181	299	4.5	2,286	263	1,910	.23	.41	3.6	Trace
	Breakfast cereals. See Corn, Oats, Rice, Wheat, also Bran, Farina.																	
	Broadbeans, raw:[6]																	
481	Immature seeds	1 lb	454	72.3	476	38.1	1.8	80.7	122	712	10.0	18	2,136	1,000	1.27	.77	7.3	136
482	Mature seeds, dry	1 lb	454	11.9	1,533	113.9	7.7	264.0	463	1,774	32.2	—	—	320	2.27	1.36	11.3	—
	Broccoli, stalks (head or bud clusters, stem and leaves):																	
483	Raw, 1 lb. (2 large, 3 medium, or 4 small stalks)	1 lb	454	89.1	145	16.3	1.4	26.8	467	354	5.0	68	1,733	11,340	.45	1.04	4.1	513
484	Cooked (boiled), drained:																	
	Stalks, whole:																	
a	Large	1 stalk	280	91.3	73	8.7	.8	12.6	246	174	2.2	[20]28	748	7,000	.25	.56	2.2	252
b	Medium	1 stalk	180	91.3	47	5.6	.5	8.1	158	112	1.4	[20]18	481	4,500	.16	.36	1.4	162
c	Small	1 stalk	140	91.3	36	4.3	.4	6.3	123	87	1.1	[20]14	374	3,500	.13	.28	1.1	126
d	Stalks, cut into ½-in. pieces	1 cup	155	91.3	40	4.8	.5	7.0	136	96	1.2	[20]16	414	3,880	.14	.31	1.2	140
e	Stalks, whole or cut	1 lb	454	91.3	118	14.1	1.4	20.4	399	281	3.6	[20]45	1,211	11,340	.41	.91	3.6	408
	Frozen:																	
	Chopped:																	
485	Not thawed:																	
a	Container, net wt., 10 oz	1 container	284	90.6	82	9.1	.9	14.8	165	168	2.0	48	684	7,380	.20	.37	1.7	199
b	Pound	1 lb	454	90.6	132	14.5	1.4	23.6	263	268	3.2	77	1,093	11,790	.32	.59	2.7	318
486	Cooked (boiled), drained:																	
a	Yield from 10 oz., frozen broccoli	1⅝ cups	250	91.6	65	7.3	.8	11.5	185	140	1.8	[20]38	530	6,500	.15	.30	1.3	143
b	Yield from 1 lb., frozen broccoli	2½ cups	400	91.6	104	11.6	1.2	18.4	216	224	2.8	[20]60	848	10,400	.24	.48	2.0	228
c	Cup	1 cup	185	91.6	48	5.4	.6	8.5	100	104	1.3	[20]28	392	4,810	.11	.22	.9	105
d	Pound	1 lb	454	91.6	118	13.2	1.4	20.9	245	254	3.2	[20]68	962	11,790	.27	.54	2.3	259
	Spears (or stalks):																	
487	Not thawed:																	

JOY OF COOKING

Irma S. Rombauer
Marion Rombauer Becker

Illustrated by Ginnie Hofmann and Beverly Warner

THE **BOBBS-MERRILL** COMPANY, INC.
SUBSIDIARY OF HOWARD W. SAMS & CO., INC.
4300 WEST 62nd STREET • INDIANAPOLIS 6, INDIANA

Oatmeal is better in baking if soaked in boiling water with the shortening and cooled before the yeast or other leaven is added.

ROLLED OATS

These are separate flakes that respond to steaming. They are popular for adding flavor to cookies. ◗ Substitute 1⅓ cups rolled oats flakes for 1 cup all-purpose flour—combining, in breads, with wheat flours, only up to ⅓ the total.

BEAN FLOUR

◗ Substitute 4 to 5 cups bean flour for 1 cup all-purpose flour.

NUT MEAL

These finely ground dry nuts are used as a flour substitute in many Torten, see page 637.

CAROB FLOUR

This is milled into a powder from the pod of tamarind or St. John's bread. In sponge cakes, it can be used just like all-purpose wheat flour—provided the baking heat does not exceed 300°. It is more frequently used in baking to add flavor. ◗ To substitute, allow ⅛ to ¼ cup carob powder plus ⅞ to ¾ cup flour for every cup of flour. Do not bake in an oven higher than 300°, as carob powder scorches easily.

WHEAT FLOUR ALLERGY SUBSTITUTE

This can be kept on hand for use in gravies and some quick breads, pancakes and biscuits. Sift together, 6 times, ½ cup cornstarch with any of the following: ½ cup rye flour, potato flour or rice flour. If you use this combination for baking, you will need 2 teaspoons baking powder for each cup of the flour mixture. If using cornstarch or rice flour, be sure to avoid the waxy types in baking.

COOKED CEREAL

This may be ◗ substituted 1 cup cooked cereal for ¼ cup flour. But you must also cut the fluid in the recipe by 1 cup for each cup of cooked cereal used. To mix, stir the cooked cereal into the remaining fluid before combining with the other ingredients.

ABOUT CRUMBS

Be sure, in reading recipes, to note what kind of bread crumbs are called for. The results are very different, depending on whether they are dry, browned or fresh.

Finely crushed cracker crumbs, cornflakes or corn or potato chips are sometimes used in place of bread crumbs.

DRY CRUMBS

These are made from dry bread, zwieback or cake. If these materials are not sufficiently dry, crisp them, on a baking sheet in a 250° oven, before making the crumbs. Do not let the crumbs color. If only a few are being made, grind them in a rotary hand grater, or as sketched on page 521, or in a blender. If making them in large quantities, put them through a meat grinder with a medium chopping blade. Tie a bag tightly over the mouth of the grinder to catch them all.

◗ Measure dry bread crumbs as you would sugar, page 543. Store dry bread crumbs in a cool, dry place, not too tightly lidded, or they may mold.

BROWNED BREAD CRUMBS

◗ To prepare these, use dry bread crumbs, as described. Allow for each cup dry bread crumbs ½ teaspoon salt and brown them slowly in ⅓ cup butter. Use at once.

SOFT BREAD CRUMBS

◗ To prepare these, use two- to four-day-old bread. You may crumb it ◗ very lightly with your fingers. But a safer way to retain the light texture desired in such crumbs is to pull the bread apart with a fork—using a gingerly motion, as sketched. Do not crush the bread with the hand that is holding it.

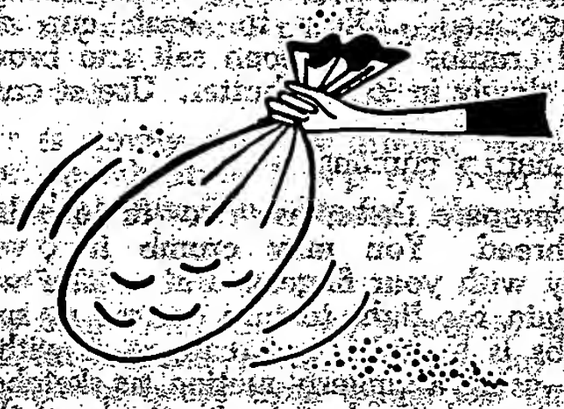
◗ To measure soft bread crumbs, pile them lightly into a cup. Do not pack them down. Use at once. Sometimes the recipe calls for soaking these fresh crumbs in water, milk or stock and pressing the moisture out before using.

ABOUT FLOURING, BREADING AND CRUMBING FOODS

When dredging food with flour or crumbs or with a more elaborately bound coating, the main thing to remember is this: you

want a thin, even and unbroken covering that will adhere. The food should be about 75°, and should be ◗ dry. If the food is floury to begin with or has a thickened sauce—like croquettes—the flouring may be omitted. But for fish fillets, shrimp, meat, anything with a moist surface, first a wiping and then a flouring is essential.

◗ To prepare a simple breading, have ready finely sifted crumbs, flour or cornmeal. Cornmeal gives the firmest coating. If the food is not fragile, simply put a small quantity of the seasoned coating material in a paper or plastic bag with the object you want to cover. Shake vigor-



ously. You will find this method gives a very even, quick and economical coating. Or, prepare:

SEASONED FLOURING OR BREADING

I. Mix:

1 cup all-purpose flour, finely sifted
dry bread crumbs or finely crushed corn flakes
1 teaspoon salt
¼ teaspoon pepper or ½ teaspoon paprika
(⅛ teaspoon ginger or nutmeg)

II. Mix:

1 cup finely sifted dry bread crumbs or crushed corn flakes or crackers
3 tablespoons grated Parmesan cheese
½ teaspoon dried herbs: savory, chervil, chives, basil or tarragon or 1/16 teaspoon rosemary

III. To prepare a more adhesive bound breading—or coating à l'anglaise—requiring egg or milk, begin by wiping the food dry. Then dip the dry food into a shallow bowl of seasoned flour. Have ready, aside from the flour, two other bowls. In the first bowl, put a mixture of slightly beaten egg, diluted with 2 teaspoons to a tablespoon of water or milk for each egg used. You may also add 2 teaspoons oil for each egg. Stir these ingredients together with 10 or 12 mild strokes. Do not let the egg get bubbly, as this makes the coating uneven.

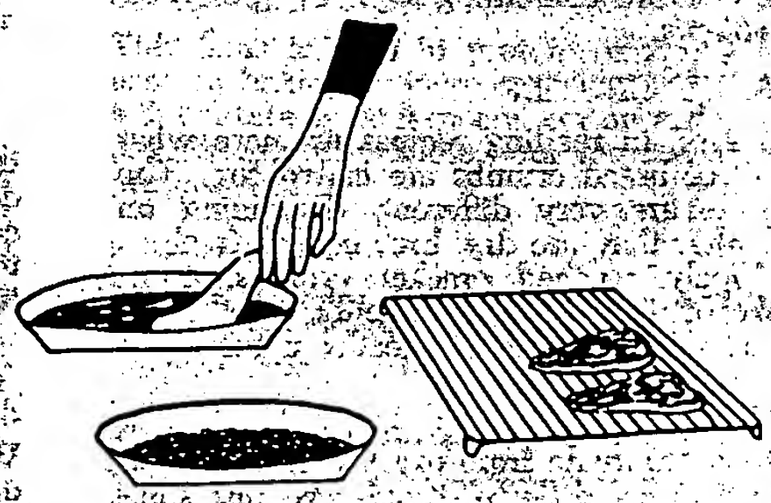
In the other bowl have ready sifted seasoned dry bread crumbs. Allow about ¾ cup crumbs for every diluted egg. This amount will coat about 8 croquettes.

As each piece of food is floured, toss it lightly from one palm to the other, patting it gently all over and encouraging any excess flour to fall off, as sketched on the left, below. Then slide the flour-coated food through the egg mixture, making sure the entire surface is contacted, as shown at center. Allow any excess moisture to drip off. Then place the food in the crumb-lined bowl. See that the crumbs adhere evenly to the shallow sides of the food as well as to its larger surfaces. If you see any vacant places sprinkle a few crumbs on them. Again discourage by patting any excess crumbs which might fall off and brown too rapidly—thus discoloring the frying fat. Handle the food very gently, so that the coating will not be cracked. ◗ Place it on a rack to dry for about 20 minutes before frying. ◗ Do not chill this food before frying, as this will tend to make it absorb an undue amount of fat.

ABOUT LEAVENS

We are all so accustomed to light breads and cakes that we seldom question the part that leavens play in the results.

Where does this rising power lie? First, the steam converted from the moisture, in any baking, may account for ⅓ to ⅘ of the expansion of the dough. The greater amount is characteristic of popovers and cakes which are rich in egg white. So, to



encourage the generation of
asset ◗ preheat your oven.
We usually think of lea
from Baking Powders, pa
milk and soda, page 505, an
which expand with the ste
gas as a major force. But
get the importance of the
corporation of air from wh
the rising power comes. T
to the chemical reactions
know how to cream fat a
616; how to fold and mi
617; how to beat eggs,
especially, be sure to kno
the whites to that state c
not dry," page 515.

ABOUT YEAST

Yeasts are living organis
billion cells to the pound-
exactly alike. They feed
produce alcohol and carb
"riser" we are after. But
as we do, to accept a Me
ward yeast doughs. They
or souls, because they see
When flour is mixed wi
a dough which is kept co
warm place—the wild ye
the air and in the flour w
and form a sour dough.
zymes in the flour to co
starch into sugar, on whic
making alcohol and carb
ganic acids and other fra
are also created to give
Sour doughs, discussed la
of this primitive bacteri
are so primitive that the
Egyptian history of 400
ened bread has been cal
venience" food—as its y
it excellent keeping qual
But with fine strains o
it seems foolish to try so
In case of necessity, thi
still be made. ◗ Two c
mixture are substituted
pressed yeast. A real
sour dough may give b
tasty flavor. But the ki
starter you get from wi
may well give you both
and disagreeable off-fla
commercial yeast is al
more sophisticated taste
gives, see page 560—
version of this method.
Yeast, just because it
ism, is dependent on d
ranges. It begins to ac
◗ and is at its best bet
It begins to die around
for baking after 143°.
and the amount of foo
life span. Therefore, it
ily computed. One-hal

signs was not legally erroneous, and because we find that the Board's finding that Valu's guide rails are *de jure* functional is supported by substantial evidence, the Board's refusal to register Valu's guide rail designs is *affirmed*, and Rexnord's cross-appeal is dismissed as moot.

AFFIRMED

COSTS

No costs.

In re Lee

U.S. Court of Appeals
Federal Circuit

No. 00-1158

Decided January 18, 2002

PATENTS

[1] Practice and procedure in Patent and Trademark Office — Board of Patent Appeals and Interferences — In general (§ 110.1101)

Patentability/Validity — Obviousness — Combining references (§ 115.0905)

Patentability/Validity — Obviousness — Evidence of (§ 115.0906)

Rejection of patent application for obviousness under 35 U.S.C. § 103 must be based on evidence comprehended by language of that section, and search for and analysis of prior art includes evidence relevant to finding of whether there is teaching, motivation, or suggestion to select and combine references relied on as evidence of obviousness; factual inquiry whether to combine references must be thorough and searching, based on objective evidence of record, and Board of Patent Appeals and Interferences must explain reasons why one of ordinary skill in art would have been motivated to select references and to combine them to render claimed invention obvious.

[2] Patentability/Validity — Obviousness — Combining references (§ 115.0905)

JUDICIAL PRACTICE AND PROCEDURE

Procedure — Judicial review — Standard of review — Patents (§ 410.4607.09)

Board of Patent Appeals and Interferences improperly relied upon "common knowledge and common sense" of person of ordinary skill in art to find invention of patent application obvious over combination of two prior art references, since factual question of motivation to select and combine references is material to patentability, and could not be resolved on subjective belief and unknown authority, since deferential review of agency decisions under Administrative Procedure Act reinforces obligation of board to develop evidentiary basis for its findings, since board's rejection of need for any specific hint or suggestion in particular reference to support combination constituted omission of relevant factor required by precedent, and thus was both legal error and arbitrary agency action, since board's findings must extend to all material facts and be documented on record, and since "common knowledge and common sense" are not specialized knowledge and expertise of agency contemplated by APA, and may not be substituted for evidence, although they may be applied to analysis of evidence.

PATENTS

[3] Practice and procedure in Patent and Trademark Office — Board of Patent Appeals and Interferences — In general (§ 110.1101)

Patentability/Validity — Obviousness — Evidence of (§ 115.0906)

JUDICIAL PRACTICE AND PROCEDURE

Procedure — Judicial review — Standard of review — Patents (§ 410.4607.09)

Patent examiners and Board of Patent Appeals and Interferences, in relying on what they assert to be general knowledge to negate patentability on ground of obviousness, must articulate that knowledge and place it on record, since examiners and board are pre-

sumed to act from viewpoint of person of ordinary skill in art in finding relevant facts, assessing significance of prior art, and making ultimate determination of obviousness issue; failure to do so is not consistent with either effective administrative procedure or effective judicial review, and board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth rationale on which it relies.

[4] Procedure — Court of Appeals for the Federal Circuit (§ 410.03)

Procedure — Judicial review — Standard of review — Patents (§ 410.4607.09)

U.S. Court of Appeals for the Federal Circuit will not consider proposed alternative grounds for affirming decision of Board of Patent Appeals and Interferences rejecting patent application for obviousness, since alternative grounds were made at oral argument and constitute post hoc rationalization for agency action, consideration of which would deprive aggrieved party of fair opportunity to support its position.

Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.

Patent application of Sang-Su Lee, serial no. 07/631,210, directed to method of automatically displaying functions of video display device and demonstrating how to select and adjust functions to facilitate user response. Applicant appeals from decision upholding rejection of all claims for obviousness, and from reaffirmation of that decision on reconsideration. Reversed and remanded.

Richard H. Stern and Robert E. Bushnell, Washington, D.C., for Sang Su Lee.

Sidney O. Johnson Jr., associate solicitor, John M. Whealan, solicitor, and Raymond T. Chen, Maximilian R. Peterson, and Mark Nagumo, associate solicitors, Arlington, Va., for Director of U.S. Patent and Trademark Office.

Before Newman, Clevenger, and Dyk, circuit judges.

Newman, J.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self-Diagnosis and Sequential-Display Method of Every Function." [1] We vacate the Board's decision for failure to meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

The Prosecution Record

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning pulses, in accordance with procedures described in the specification. Claim 10 is representative:

> 10. A method for automatically displaying functions of a video display device, comprising:
>
> determining if a demonstration mode is selected;
>
> if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and
>
> automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions.

The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it

---

[1] *Ex parte Lee*, No. 1994-1989 (Bd. Pat. App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:

> The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference.

Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the art since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to support combining the Nortrup and Thunderchopper references, the Board held, as stated *supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

Judicial Review

Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko*, 527 U.S. 150, 50 USPQ2d 1930 (1999). Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:

> 5 U.S.C. § 706(2) The reviewing court shall—
>
> (2) hold unlawful and set aside agency actions, findings, and conclusions found to be—
>
> (A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;
>
> * * * *
>
> (E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal

must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:

> The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational.

Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd., 522 U.S. 359, 374 (1998) (citation omitted). This standard requires that the agency not only have reached a sound decision, but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 416 (1971). Judicial review of a Board decision denying an application for patent is thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. *See In re Zurko*, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001) (review is on the administrative record); *In re Gartside*, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774 (Fed. Cir. 2000) (Board decision "must be justified within the four corners of the record").

[1] As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. § 103 must be based on evidence comprehended by the language of that section." *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983). The essential factual evidence on the issue of obviousness is set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. *See, e.g., McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the *Graham* factors).

"The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. *See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed. Cir. 2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding' ") (quoting *C.R. Bard, Inc., v. M3 Systems, Inc.*, 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed. Cir. 1998)); *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (" 'teachings of references can be combined *only* if there is some suggestion or incentive to do so.' ") (emphasis in original) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)).

The need for specificity pervades this authority. *See, e.g., In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); *In re Rouffet*, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed. Cir. 1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combina-

tion. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); *In re Fritch*, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

[2] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that which Lee described. The examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. *See, e.g., Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43 (1983) ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.' ") (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168 (1962)); *Securities & Exchange Comm'n v. Chenery Corp.*, 318 U.S. 80, 94 (1943) ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

In its decision on Lee's patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. *See Motor Vehicle Manufacturers*, 463 U.S. at 43 ("an agency rule would be arbitrary and capricious if the agency . . . entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy*, 50 F.3d 990, 992 (Fed. Cir. 1995) ("It is well established that agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp.*, 817 F.2d 74, 75 (9th Cir. 1987), an agency is "not free to refuse to follow circuit precedent."

The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise. Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. *See Baltimore and Ohio R. R. Co. v. Aberdeen & Rockfish R. R. Co.*, 393 U.S. 87, 91-92 (1968) (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the Administrative Procedure Act. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697, that "deficiencies of the cited references cannot be remedied by

the Board's general conclusions about what is 'basic knowledge' or 'common sense.' " The Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. *See Allentown Mack*, 522 U.S. at 376 ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle . . . .")

The case on which the Board relies for its departure from precedent, *In re Bozek*, 416 F.2d 1385, 163 USPQ 545 (CCPA 1969), indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and common sense are a substitute for evidence, but only that they may be applied to analysis of the evidence. *Bozek* did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does *Bozek*, after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in *Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc.*, 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed. Cir. 1999), that *Bozek*'s reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[3] The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

Alternative Grounds

[4] At oral argument the PTO Solicitor proposed alternative grounds on which this court might affirm the Board's decision. However, as stated in *Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962), "courts may not accept appellate counsel's *post hoc* rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by the agency. "If those grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers to be a more adequate or proper basis." *Securities & Exchange Comm'n v. Chenery Corp.*, 332 U.S. 194, 196 (1947). As reiterated in *Federal Election Comm'n v. Akins*, 524 U.S. 11, 25 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case — even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

Further Proceedings

Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In *Radio-Television News Directors Ass'n v. FCC*, 184 F.3d 872 (D.C.

Cir. 1999) the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from *Checkosky v. Securities & Exch. Comm'n*, 23 F.3d 452, 464 (D.C. Cir. 1994); the court explained that "[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action." *Id.* at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for "reasoned decisionmaking." Remand for these purposes is required. *See Overton Park*, 401 U.S. at 420-221 (remanding for further proceedings appropriate to the administrative process).

VACATED AND REMANDED

Barbour v. Head

U.S. District Court
Southern District of Texas

No. G-01-491

Decided December 21, 2001

COPYRIGHTS

[1] Non-copyrightable matter — Ideas and systems (§ 211.05)

Defendants are not entitled to summary judgment that plaintiffs' cooking recipes are uncopyrightable, even though 17 U.S.C. § 102(b) denies copyright protection to mere procedures or processes, since neither courts nor Register of Copyrights have declared that recipes are per se uncopyrightable, since defendants have not shown that plaintiffs' cookbook is copyrighted as factual compilation or collective work rather than literary work, and since even if book is not literary work, genuine issue of material fact exists as to whether plaintiffs' recipes, which contain more than mechanical listings of ingredients and cooking instructions, represent mere unprotected facts or protectable expression.

JUDICIAL PRACTICE AND PROCEDURE

[2] Procedure — Limitations period; timeliness (§ 410.05)

Plaintiffs' claim for copyright infringement is not barred by three-year statute of limitations specified by 17 U.S.C. § 507(b), even though infringement claim was brought more than three years after infringing work was first published, since discovery rule and other equitable tolling doctrines apply to copyright claims, since plaintiffs' cause of action arguably did not accrue until they discovered defendants' book, less than one year before suit was brought, and since even if claim accrued on date of first publication, limitations period bars only remedy, not substantive right.

Action by Judy Barbour and Cookbook Resources LLC against James Head and Penfield Press Inc. for copyright infringement, and for unfair competition through misappropriation and conversion. On defendants' motion for summary judgment. Denied as to copyright claims; granted as to state law claims.

G.P. Hardy III, Houston, Texas, for plaintiffs.

Karen Bryant Tripp, Houston, for defendants.

Kent, J.

ORDER GRANTING IN PART DEFENDANT PENFIELD PRESS' MOTION TO DISMISS

This case involves a rustled cowboy cookbook. On August 13, 2001, Plaintiffs Judy Barbour ("Barbour") and Cookbook Resources, L.L.C. ("Cookbook Resources") filed causes of action for copyright infringement, unfair competition through misappropriation, and conversion, with which they're fixin' to brand Defendants James Head ("Head") and Penfield Press, Inc. ("Penfield Press"). On October 25, 2001, to bust out of the corral, Defendant Penfield Press filed a Motion to Dismiss pursuant to Fed.R.Civ.P. 12(b)(6). For the reasons articulated below, Defendant's Motion to Dismiss shall be